

# Research Accelerator Division All Hands Meeting

***Stuart Henderson***

***August 16, 2006***



# Mission of the Research Accelerator Division

- **Enable world-class neutron science by operating and maintaining the SNS accelerator complex and the site at the highest level of**
  - **Safety,**
  - **Quality,**
  - **Efficiency and**
  - **Performance**

# Research Accelerator Division: Our Products and Services

**The Research Accelerator Division contains all groups and technical systems necessary for**

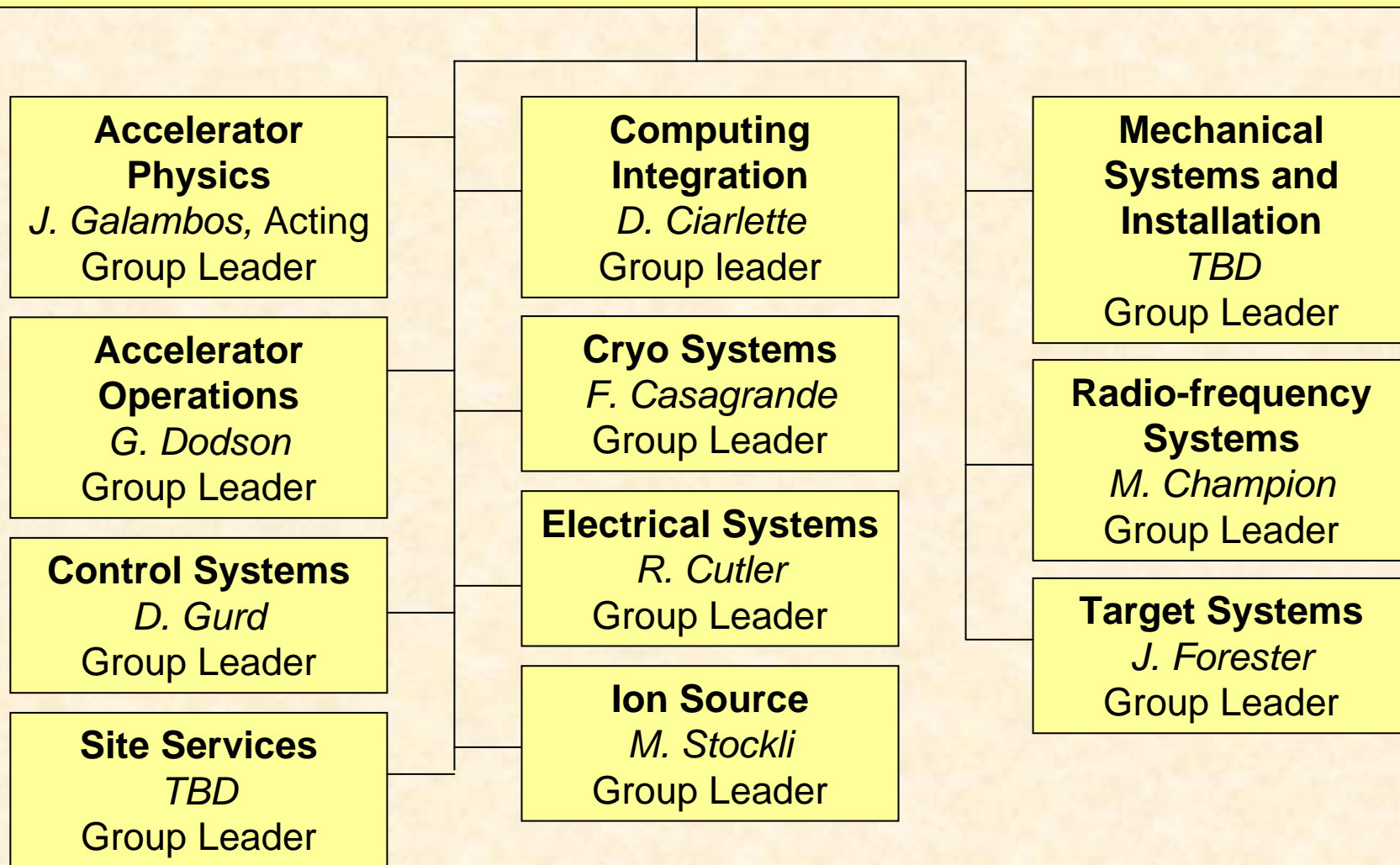
- **generating neutrons in support of the science program:**
  - Accelerator Systems
  - Target Systems
  - Site Utilities
- **...providing infrastructure support and services for the larger SNS complex**
  - Site Operations
  - Site development (construction management)
  - Labor resources and resource management
  - Computing Infrastructure

The “Accelerator Complex”

# Research Accelerator Division

Stuart Henderson, Division Director

Jim Lawson, Deputy Division Director and Facility Complex Manager



# SNS Project is Complete: What Now?

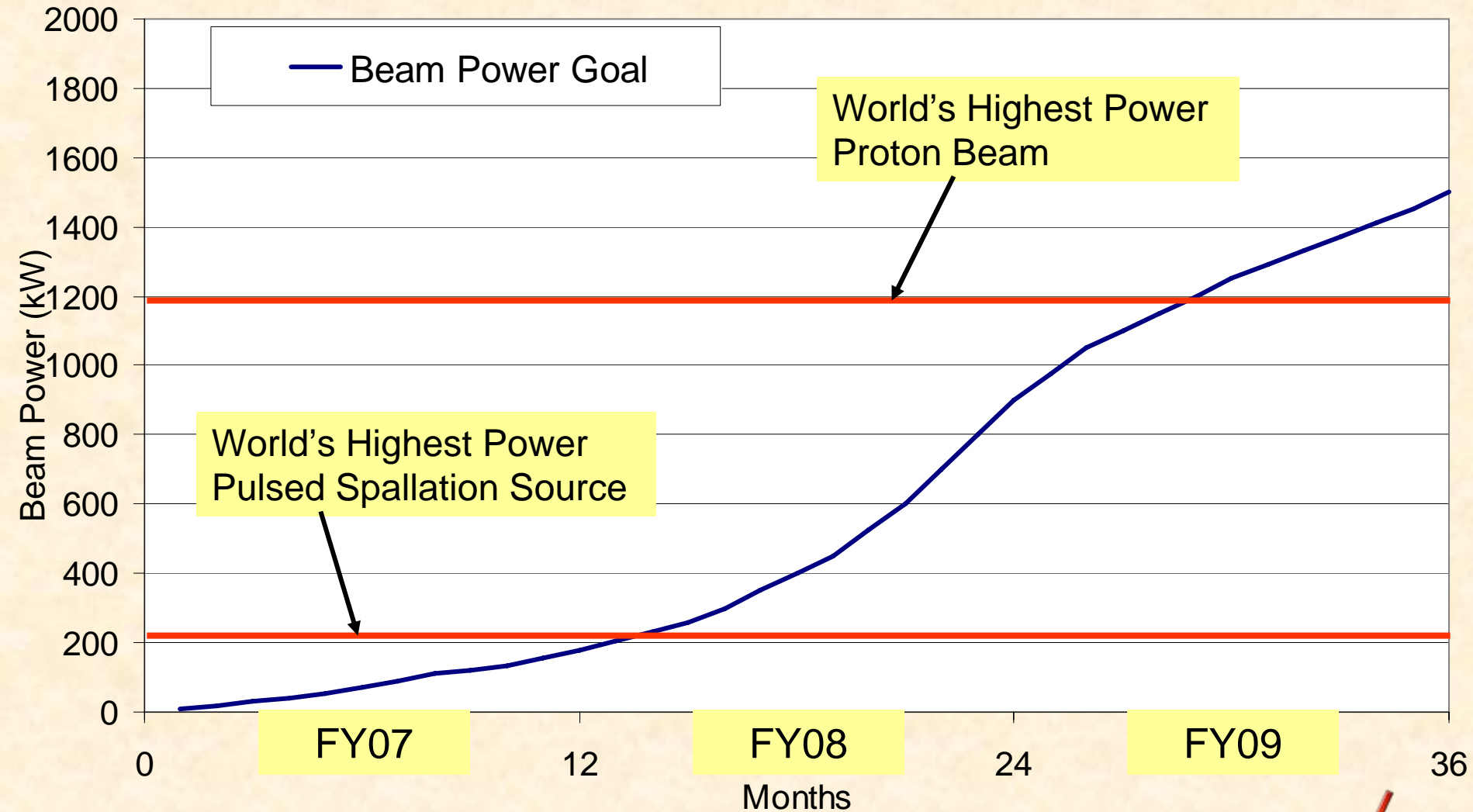
- **For several years we were working toward CD-4 Project Completion**
- **With that behind us, it's natural to wonder “what now?”**
- **We are about to confront a new set of challenges and meet a new set of goals**
- **These challenges are as difficult and engaging as those of the construction phase of the project (or even more so!)**

# Our Product: Neutrons

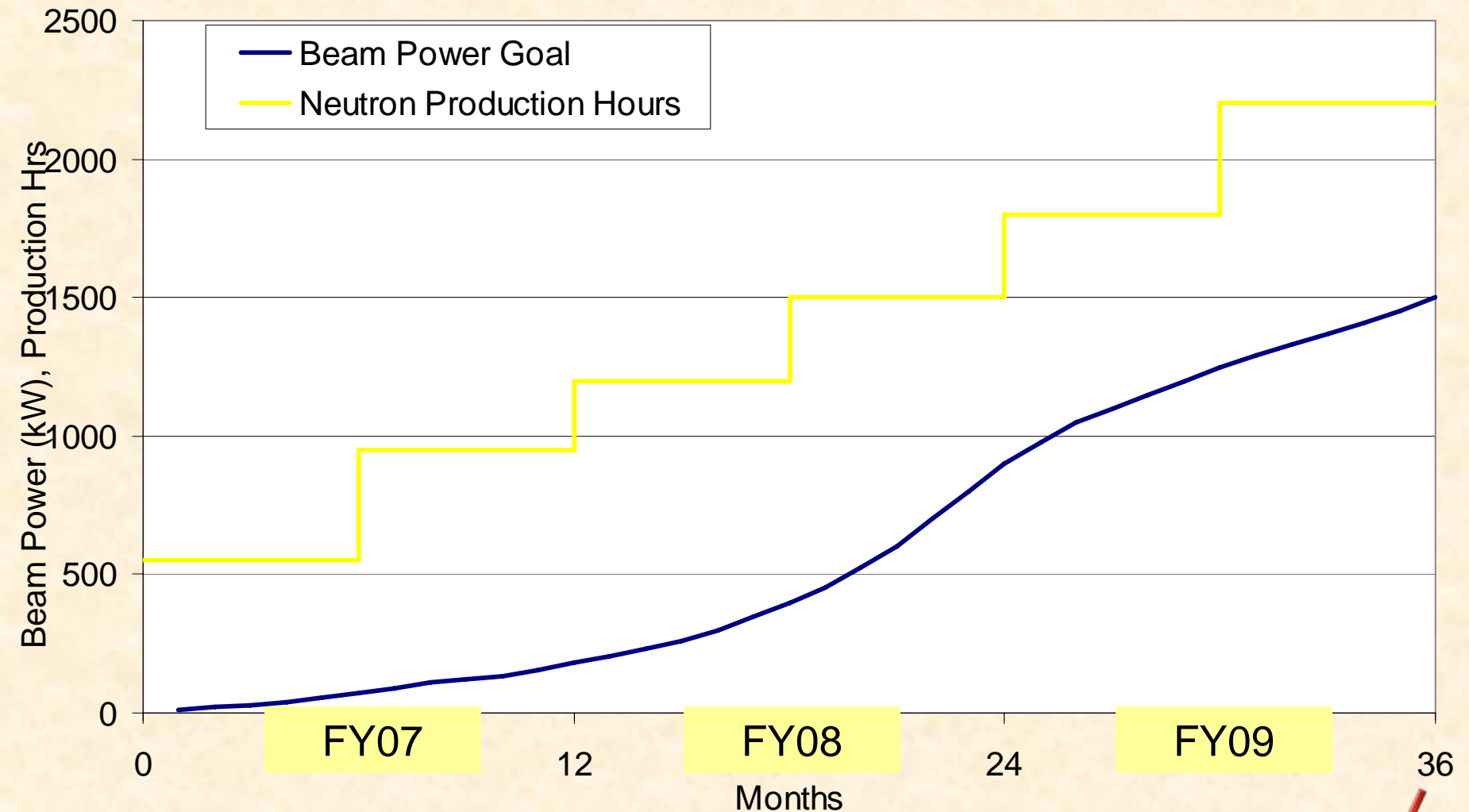
- In a given time, the number of neutrons produced, and therefore the scientific output of the facility, is proportional to MW-hrs of proton beam on target
- Neutron production requires three ingredients
  1. Beam Power on Target
  2. Operating Hours
  3. Reliability



# Performance Goals: Beam Power

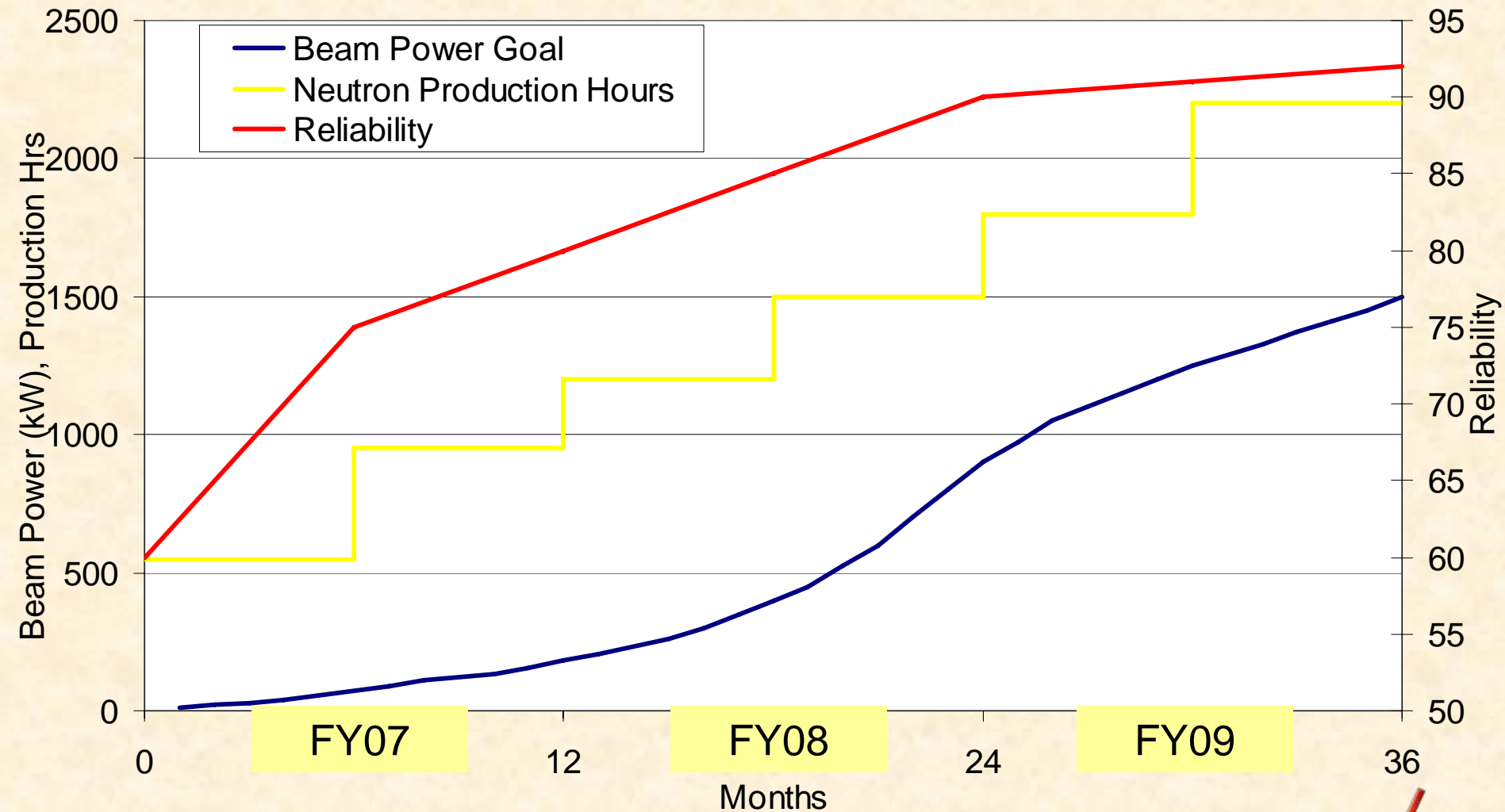


# Performance Goals: Beam Power and Neutron Production Hours





# Performance Goals: Power, Hours and Reliability



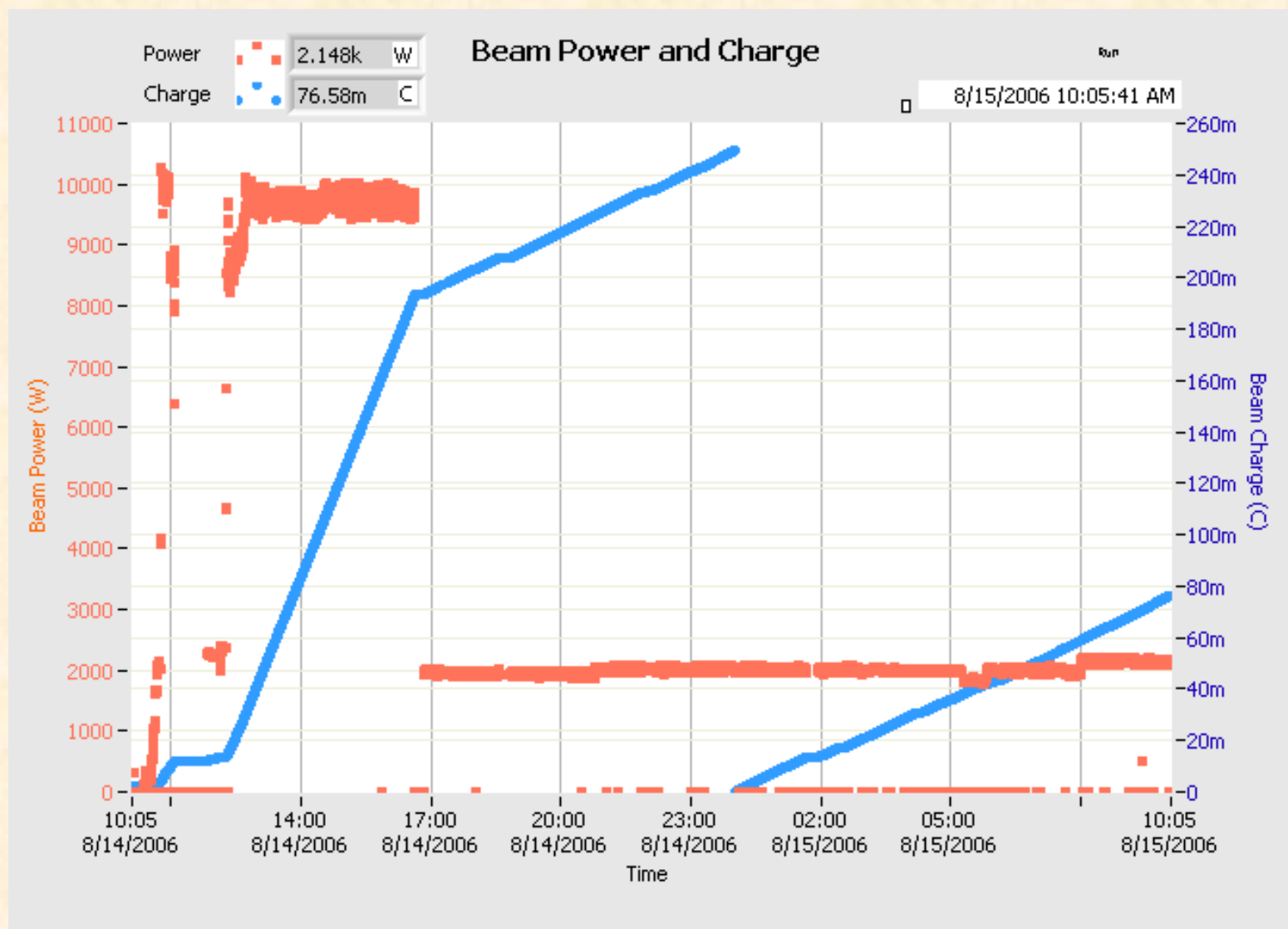
# Making use of the time

- **The Accelerator Complex will be in one of three states:**
  - **Operating for Neutron Production**
    - Scheduled in advance
    - Emphasis on delivering neutrons when scheduled
    - Strive for high reliability
  - **Operating for Accelerator Physics studies**
    - Diagnose performance limitations
    - Implement performance improvements
    - Expect to deliver neutrons as a by-product of some studies
  - **Down for maintenance**
    - Either in short, single shift maintenance days, or
    - 4-8 week shutdowns for major maintenance, repair and installation work

# Performance Goals for FY07

- Sustained 90 kW beam on target by April 2007
- High-Power Readiness Review in March for full power (1.5 MW) operation
- Sustained 180 kW beam on target achieved by September 2007
- Deliver 1500 hours of neutron production
- Operate the accelerator for a total of 3500 hours
- Integrate >146 MW-hrs of beam on target (average of ~100 kW)
- Reliability integrated over 2007 of >75% for neutron production
- All this while ensuring high standards of Safety for staff and contractors

# Tracking the Progress: Channel 14



# Sample Operations Schedule for FY07

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12
13	13	13	13	13	13	13	13	13	13	13	13
14	14	14	14	14	14	14	14	14	14	14	14
15	15	15	15	15	15	15	15	15	15	15	15
16	16	16	16	16	16	16	16	16	16	16	16
17	17	17	17	17	17	17	17	17	17	17	17
18	18	18	18	18	18	18	18	18	18	18	18
19	19	19	19	19	19	19	19	19	19	19	19
20	20	20	20	20	20	20	20	20	20	20	20
21	21	21	21	21	21	21	21	21	21	21	21
22	22	22	22	22	22	22	22	22	22	22	22
23	23	23	23	23	23	23	23	23	23	23	23
24	24	24	24	24	24	24	24	24	24	24	24
25	25	25	25	25	25	25	25	25	25	25	25
26	26	26	26	26	26	26	26	26	26	26	26
27	27	27	27	27	27	27	27	27	27	27	27
28	28	28	28	28	28	28	28	28	28	28	28
29	29	29	29	29	29	29	29	29	29	29	29
30	30	30	30	30	30	30	30	30	30	30	30
31	31	31	31	31	31	31	31	31	31	31	31
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept

- Machine Downtime Major Periods(Maintenance/Upgrades)
- Machine Downtime Minor Periods(Weekly Maintenance)
- Machine Uptime Major Periods



**OAK RIDGE NATIONAL LABORATORY**  
**U. S. DEPARTMENT OF ENERGY**

RAD All-Hands Meeting, August 16, 2006



# Challenges: Technical

- **Climbing an aggressive beam power ramp-up curve**
  - **Beamloss and activation**
    - ⇒ **Accelerator physics study time**
  - **Superconducting linac performance**
    - ⇒ **SRF Task Force**
- **Improving reliability**
  - **A number of technical systems with poor performance or reliability are being repaired/reworked/replaced**
    - ⇒ **Will supply sufficient time for maintenance/repair**
    - ⇒ **Have a healthy M&S budget in FY07**
- **Planning and executing smooth and productive maintenance periods:**
  - **Integration between site, target, accelerator is complex; requires coordination to complete priority work in the time available**
    - ⇒ **Maintenance Coordinator and Working Group**



# Challenges: Cultural

- **We have to turn this collection of technical hardware into a smoothly running, productive facility**
- **We are making the difficult transition from a Construction culture to an Operations culture**
- **Construction Culture:**
  - Install, install, install
  - Operate the accelerator long enough to meet commissioning goals, then turn off and continue to install
- **Operations Culture:**
  - Run the machine, run the machine, run the machine
  - If it aint broke, don't fix it
  - Finish maintenance to get the accelerator back on
  - Time is money: one day of accelerator time is worth \$0.5M
  - Increased emphasis on
    - rigor and discipline in operations
    - Detailed planning
    - Incorporating ALARA into work planning

# Safety

- **Nothing we do is more important than the safety of the staff and contractors**
- **We need to continue the good safety practices that served us well in construction**
- **We need to realize that we are entering a new era, where radiological safety is becoming a bigger part of our everyday work (ALARA)**
- **Work control will be formalized**
- **We will continue to emphasize Safety Observation, Safety Walkthroughs reinforcing line management responsibility**

# Conclusion

- **We are in the best imaginable position:**
  - We have completed the biggest DOE scientific construction project on-time and on-budget and met all technical performance goals
  - You, the staff, have demonstrated your abilities time and again
  - Everyone should take real pride in this success
  - In a time when many other accelerator labs are struggling for long-term viability or even just survival, we have a healthy operating budget and a long term commitment from the DOE
- **We now have a different set of challenges facing us**
  - Together we will turn this complex into a world-class operating facility